METHOD FOR DYNAMIC ALLOCATION OF SLOT BANDWIDTH OF AN EXCHANGER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Chinese Patent Application No. 02126617.4 filed July 18, 2002. The disclosure of the above application is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to telecommunication field, and more particularly to a dynamic allocation method for bandwidth of slot on an exchange.

BACKGROUND OF THE INVENTION

[0003] In an exchange design, sometimes slot structure is used. In the past design, the number of slots and the line flow from a slot to the main exchange board are fixed. In this way, flexibility of bandwidth allocation is limited at the hardware. For example, if a broad bandwidth slot is plugged with a service processing board that has lower requirement of data bandwidth, then bandwidth resource is wasted.

[0004] Fig. 1 shows a slot diagram of an exchange. There are four slots in total, and each slot is designed with upstream bandwidth 8G. Therefore, each of the four slots can be respectively plugged in a service processing board

with upstream bandwidth 8G, for example this service processing board supports 8 gigabit Ethernet. If a Ethernet process board with 3G upstream bandwidth is intended to be plugged in one of the slots, for example this board supports thirty 100M Ethernet, the bandwidth of this slot is wasted. In this case only 3G upstream bandwidth is used, however another 5G upstream bandwidth is wasted.

[0005] If using two slots having 4G upstream bandwidth substitutes as one slot of the original four slots with 8G upstream bandwidth, two 100M Ethernet process boards can be plugged in the exchange. Nevertheless, there are only three slots are available for service processing board with 8G bandwidth. If a service processing board with 8G bandwidth is plugged in the slot with upstream bandwidth 4G, it will cause 50% service flow to be blocked. In some cases, this design is forbidden.

SUMMARY OF THE INVENTION

[0006] Object of the invention is to overcome the present technology shortcomings that makes allocation upstream bandwidth inflexible. The invention proposes a method for dynamic allocation of slot bandwidth on an exchange. This dynamic allocation of slot bandwidth method not only can provide unblock service to a larger flow service processing board but also can allocate upstream bandwidth to more slots to support multiple lower flow service processing boards to avoid bandwidth waste.

[0007] The method for dynamic allocation of slot bandwidth on an exchange comprises the following steps:

(1) setting the number of slots for a dynamic allocation bandwidth being *N*, and the bandwidth need to be dynamically allocated being *B*;

(2) defining a minimum allocation bandwidth unit being ΔB, according to practical requirement;

(3) setting $B/\Delta B$ pieces of *N*-selected-one devices, and the input bandwidth of the *N*-selected-one device being $N^*\Delta B$;

(4) connecting each slot with one input of each *N*-selected-one device, and connecting all output of the *N*-selected-one devices with a main exchange model;

(5) controlling the *N*-selected-one device being gated to allocate the bandwidth to slot.

[0008] Therefore, the total bandwidth *B* can be freely allocated to *N* slots. Repeatedly using the method, any allocation scheme can be flexibly implemented.

[0009] The method for dynamic allocation of slot bandwidth on an exchange, proposed by the invention, allocates the bandwidth to several slots, and each slot has less bandwidth. The advantage is more service processing boards with small flow can be plugged-in, or when a block happens, more service ports can be provided. By this method the bandwidth from slot to the main exchange board can be dynamically configured, i.e., the upstream bandwidth allocated to each slot is flexible. This high efficiency allocation provides service

ports configuration as flexible as possible to make full use of upstream bandwidth.

[0010] Further areas of applicability of the present invention will become apparent from the detailed description provided hereinafter. It should be understood that the detailed description and specific examples, while indicating the preferred embodiment of the invention, are intended for purposes of illustration only and are not intended to limit the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The present invention will become more fully understood from the detailed description and the accompanying drawings, wherein:

[0012] Fig. 1 shows a fixed allocation diagram of upstream bandwidth of present technique.

[0013] Fig. 2 shows a dynamic allocation diagram of upstream bandwidth of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] The following description of the preferred embodiments is merely exemplary in nature and is in no way intended to limit the invention, its application, or uses. The present invention will now be described more fully hereinafter with reference to the accompanying drawings, in which preferred embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the

embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

[0015] Principle of the invention, a dynamic upstream bandwidth allocation method for slots on an exchange, is shown on Fig. 2. Suppose there are *N* slots for dynamic allocation of upstream bandwidth, and the available upstream bandwidth is *B*. The minimum upstream bandwidth unit for allocating is ΔB. On the main exchange board, $B/\Delta B$ pieces of *N*-selected-one device are set. Input bandwidth of every *N*-selected-one device is $N^*\Delta B$, i.e., a ΔB bandwidth is allocated to every input of the *N*-selected-one device. Each of the *N* slots is connected to all *N*-selected-one devices of the main exchange board, i.e., each slot is connected with one input of each *N*-selected-one device, and all output of the *N*-selected-one devices is connected with a main exchange model. There is a programmable logic chip controlled by CPU on the main exchange board. The programmable logic chip outputs strobe signals to control the *N*-selected-one device, and to allocate bandwidth to the slot according to requirement.

[0016] Using the method mentioned above, the total upstream bandwidth *B* can be freely allocated to *N* slots. Repeatedly using the above method, any allocation scheme can be flexibly implemented.

[0017] An embodiment of the invention is as follows. Suppose there are two slots for dynamic allocation, and the upstream bandwidth to be allocated is 4G, i.e., B = 4G. The minimum unit of allocated upstream bandwidth is ΔB =

2G. Two-selected-one device can be used on the main exchange board, and the number of the devices is $B/\Delta B = 4/2 = 2$. Therefore, two two-selected-one devices are used, and every input bandwidth of the devices is 2G. Consequently, upstream bandwidth 4G can be flexibly allocated between these two slots. In this embodiment, the two-selected-one device is type VSC713YB, made by VITESSE Company, which is a 1.25GHz Ethernet signal driver, and the logic control chip is an EPLD programmable logic chip with type EPM7256AEQ208-10, made by ALTERA Company.

[0018] According to different requirement, the invention method can use three-selected-one device or four-selected-one device etc. to flexibly form different bandwidth allocation schemes.

[0019] The description of the invention is merely exemplary in nature and, thus, variations that do not depart from the gist of the invention are intended to be within the scope of the invention. Such variations are not to be regarded as a departure from the spirit and scope of the invention.